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ABSTRACT

The Teacher Practices Observation Record (TPOR) and the Florida Climate and Control System (FLACCS) were reviewed to determine their appropriateness for measuring teacher competencies defined by teachers in Carroll County, Georgia. The TPOR looks at the way the teacher develops subject matter and thinking processes of pupils through the eyes of Dewey's experimentalism. FLACCS records teacher attempts to modify the behavior of pupils in the classroom, both verbal and nonverbal, scaled from relatively gentle, unobstrusive, noncoersive behaviors to ordering and commanding, and the use of negative affect in the management of behavior. Following the assembly of items into measures for behavioral indicators, by observers, these measures were pooled across observers to create a single measure for each teacher for each indicator, then indicators were pooled tc represent competencies for each teacher for each observation instrument, and finally the data were pooled across the two instruments, FLACCS and TPOR, to create nine competencies as these two instruments reflected the perception of the Carroll County teachers. Two primary results emerged: the competencies often formed linear relations with the gain measures, but they were about as often contrary to expectations as in agreement with them, and the second outcome was the tendency of the competencies to form linear relations, but, in contrast, for the empirical-logical composites to form complex relations with the pupil gain measures. (RC)

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"Validity of Two Sign Systems Based on Inductively Derived Teacher Competencies"

Presented in a Symposium Titled:

Classroom Observation and Teaching Competency*

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Introduction

The previous paper has identified the source of the competencies defined by Carroll County teachers based on intensive discussion of their perceptions of the competencies necessary for teachers after review of competencies identified by the major competency based programs in the nation. This list was then validated against the judgments of all teachers in the same county.

The next step was to identify behaviors to measure these competencies. It seemed reasonable to review existing instruments which have had a history of developmental work, and to draw from them already existing measures which appeared to represent the competencies identified by Carroll County teachers, insofar as possible. Such a process would enable the project to start materially further along in the developmental process, avoid duplication of effort, and capitalize on the experience and empirical work of previous instrument developers.

The two instruments which will be reported here, as they were involved in that process, were the Teacher Practices Observation Record (TPOR), developed by Brown (1968), and the Florida Climate and Control System (FLACCS) developed by Soar, Soar and Ragosta, (1971). The TPOR looks at the way the teacher develops subject matter and the thinking process of pupils through the eyes of Dewey's experimentalism. It records such information as whether the problem is the teacher's or the pupils'; whether pupils are actively involved in the development of the problem, or whether it comes "prepackaged", whether pupils seek materials, or work from narrowly defined sources; whether pupil ideas are welcomed in the development of ideas or whether pupils are expected to conform to the teacher's expectations and the pattern she has predetermined for the development of the unit; whether the teacher gives immediate "right-wrong" feedback; and whether motivation is intrinsic or extrinsic. There is a total of 62 such paired items. FLACCS records teacher attempts to modify the behavior of pupils in the classroom, both verbal and nonverbal, scaled from relatively gentle, unobtrusive, noncoersive behaviors to ordering and commanding, and the use of negative affect in the management of behavior. It also records the response of pupils to these management attempts by the teacher, the extent to which pupils themselves assume responsibility for an activity, the kinds of grouping and freedom of movement of pupils in the classroom, and the expression of affection in the eight combination of teacher-pupil, verbal-nonverbal and positive-negative.

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Selecting Behaviors to Represent Competencies

The process of identifying specific behavioral measures to represent teacher competencies presented problems and uncertainties. The competencies themselves were written at high levels of inference, but indicators were also identified which represented somewhat more specific behaviors on the part of teachers and pupils. It seemed reasonable to expect that the same indicator might appear in relation to several competencies. For example, task involvement by the pupil might be an indicator of effective communication by the teacher, selection and differentiation of materials, and effective classroom management. But when these indicators were used to identify specific behavioral measures, considerable overlap from competency to competency occurred. In addition to this, there was the problem that both competencies and indicators had been written at sufficiently high levels of inference that differentiating the meanings of one from another was often difficult. As an example of the occurence of the same indicator across competencies, pupil task involvement was described in one way or another in 6 of the 9 competencies; and the relation of competencies to each other is reflected in the relation between competency 3, "Demonstrates ability to communicate effectively with students", and 4, "Assists students in using a variety of relevant communication techniques." While the focus of each competency is clearly different, perhaps because we know so little in fine grained detail about what teacher behavior promotes what pupil growth, distinguishing between the competencies at the behavioral level was not easily done. Similarly, competency 1, "Gathers and uses information relating to individual differences among students," seems to imply behaviors in common with competency 7, "Uses a variety of methods and materials to stimulate and promote pupil learning;" and both seem to relate to a degree with competency 2, "Organizes pupils, resources and materials for effective instruction."

After items had been identified to make up behavioral measures of each of the indicators, it seemed obligatory to follow recommendations made by some of the panelists to assure positive interrelationships among the items making up each indicator (Medley, Soar & Soar, 1975). When this was done, items which logically belonged in the cluster making up the indicators were sometimes found not to belong together on the basis of their intercorrelation. For example, one of the indicators for competency 3 was "Uses a variety of methods, verbal and nonverbal, to deliver instructions." Empirically, the verbal and nonverbal instructions given by teachers were scarcely related, and this raises the logical problem of what behavioral measures to assemble to represent that indicator. We did pool items representing those behaviors on the logic that this was required by the competency as the teachers had defined it, feeling that the problem was inherent in the process of developing measures based on logical definitions. But in other cases where only an item or two failed to relate to the remainder of a cluster of items, the unrelated item was dropped.

Reliabilities of the indicators were estimated by correlating the data of different observers who had observed on different occasions, following the recommendations of Medley and Mitzel (1963) and echoed by McGaw, Wardrop, and Bunda (1972). These were not high by the usual standards for reliability, ranging from zero to .75, but most would become significant when adjusted by Spearman-Brown procedure to recognize the later pooling which was to be done.

Following the assembly of items into measures for behavioral indicators, by observer, these measures were pooled across observers to create a single measure for each teacher for each indicator, then indicators were pooled to represent competencies for each teacher for each observation instrument, and finally the data were pooled across the two instruments, FLACCS and TPOR, to create nine competencies as these two instruments reflected the perceptions of the Carroll County teachers.

Empirical-Logical Composites

The other measures which were used in the analyses of these data were composites of teacher behavior which were described in an earlier report (Soar & Soar, 1973). They were derived partially on a logical basis, but the logical analyses were based on a series of earlier factor analyses, study of those factors in relation to measures of pupil gain, and subjective reactions to observation in classroom through the eyes of these measures. They were included in the analysis because they seemed to make distinctions that are not commonly made by teachers in the field. In particular, they distinguish teacher control of behavior from teacher control of the choice of the learning task, and both of these from teacher control of pupil thought. Past correlational data indicated that teachers do not typically make these distinctions, although a few do. Limited data also suggested that the distinction may provide useful measures for predicting pupil gain.

Analysis of Data

As indicated in the earlier paper, pupil achievement and self-concept data were reduced to adjusted classroom mean post scores covarying pretest and socioeconomic status. The sample was made up of the largest sets of grade levels in which the same tests were used. Twenty-four classrooms were available in grades three through eight in which the Iowa Tests of Basic Skills had been used, and forty classrooms, grades four through 12 in which the How I See Myself self-concept measure was used.

Five achievement subtests selected to cover a wide range of cognitive levels, and five self-concept subscales were used as dependent variables in multiple regression analyses in which the independent variables were the competencies derived by the Carroll County teachers and, in another analysis, the empirical-logical composites. The process measures were used not only as linear variables, but also as product and squared terms to test for nonlinear relations and for interactions of the behavior measures with either socioeconomic status or grade level (Kerlinger & Pedhauzur, 1973). Since the number of variables used in each multiple regression exceeded that which would be appropriate under a conservative use of the method, the data are presented separately for a "best" model based on the smaller number of linear relationships, and for later phases of the analysis in which nonlinear and interaction terms were permitted to enter. Total amounts of variance accounted for are not reported since they are likely to be inflated as a consequence of the number of variables employed, and that same effect can be expected to some degree for the individual variables. But at the same time, our limited knowledge in this area of research and the expense of collecting such data seem to argue for exploring possibilities which conservative statistical practice would forbid, recognizing the uncertainty of the results.

Results

Results for achievement are presented in Tables 1 and 2, the results for self-concept in Tables 3 and 4. The lists of behavior measures are shown at the bottom of Tables 1 and 2. Since the results are reported in unconventional fashion in order to present them more compactly, a footnote at the bottom of Table 3 explains the manner in which the results can be interpreted.

Although for the sake of brevity, results are sometimes described in terms which imply causality, the study is a correlational one, and causal conclusions cannot be drawn.

The results for the teacher derived competencies as they related to pupil achievement gain are shown in Table 1. Since all of the competencies are written to represent teacher behaviors which are assumed to be important to the growth of pupils, the linear relationships should be positive. Although the list of significant linear relationships is encouraging, six of the eight relationships are in the negative direction, which presents interpretive difficulties. The two positive relationships are very reasonable: Competency 2, Organizes pupils, resources and materials for effective instruction, is a very reasonable measure to be related to reading growth. Similiarly, Competency 9, Reacts with sensitivity to the needs and feelings of others, is a very reasonable measure to relate to growth in arithmetic concepts -- perhaps the subject which more students find difficult and threatening than any other. This finding is reminiscent of Flanders (1965) report of finding more teacher acceptance of pupil affect in math classes than in social studies classes (as he explains informally, because more students cried there). But the negative relationship of that same competency with vocabulary perhaps indicates that a teacher who spends considerable time in a close, one-to-one "counseling" relationship with students is not sufficiently available as a model to all pupils to facilitate vocabulary growth. However, the frequency of unexpected relationships makes interpretation of any of these results doubtful.

Description of the interactions is difficult, because the contrast is relative. The sign may indicate a behavior which is more facilitative of growth at higher grade levels, for example, or less so at lower grade levels, and either statement should be taken as including the opposite pattern as a possibility. At the risk of over simplifying, the interactions with grade level indicated that high amounts of:

C 3, Demonstrates ability to communicate effectively with students, was associated with greater achievement gains at the lower grades for vocabulary and arithmetic problems.

C 1, Gathers and uses information relating to individual differences among students, was associated with greater achievement gains at the higher grade levels.

The latter finding seems reasonable in the light of the increased range of achievement found at the higher grade levels.

The results for the relationships between pupil achievement and the empirical-logical composites are shown in Table 2. The fact of the few linear relations and the many complex relations is perplexing, particularly in comparison with the teacher derived competencies.

The negative relation of E 7, Closeness of teacher attention to pupils, with vocabulary growth parallels the findings for C 9 with a similar name, despite the fact that only one item was common to the two measures. The negative relation between E 3, Harsh control, and pupil reading growth follows expectations.

Results for the interactions showed that greater gain for low SES pupils was associated with smaller amounts of:

E 2, Teacher control, general and

E 3, Harsh control,

and was associated with greater amounts of:

E 1, Gentle verbal control, and

E 4, Teacher choice of subject matter.

In a general way, these four interactions with SES seem to have in common the implication that low SES pupils profit from greater amounts of task structure and an unobtrusive style of management of behavior, but that they are hindered in growth by teacher behavior which is more harsh and narrowly restrictive.

Interactions with grade level indicated that greater gains for lower grade pupils were associated with greater amounts of:

E 1, Gentle verbal control, and

E 7, Closeness of teacher attention to pupils.

The latter finding modifies the interpretation of the negative relation between E 7 and vocabulary growth, showing that the negative relationship increases as grade level increases.

Among the three nonlinear relations, E 4, Teacher choice of subject matter, appeared twice as a curve opening upward, which is uninterpretable. E 5, Restrictive treatment of subject matter, appeared as an inverted U for spelling, indicated that an intermediate amount of the behavior was associated with greatest gain.

The results for relations between teacher derived competencies and pupil self-concept gain are shown in Table 3. Again, the pattern of linear relations for competencies emerges, this time with no significant complex relations. Four of the relationships are in the positive direction all of which seem reasonable in relation to self-concept gain:

C 1, Gathers and uses information relating to individual differences among students (two relations),

C 8, Promotes self awareness and positive self-concepts, and

C 6, Responds appropriately to pupil coping behavior.

But the interpretive problem involves C 4, Assists students in using a variety of relevant communication techniques, which relates negatively to three of the self-concept measures.

The relations between self-concept gain and the empirical-logical composites are shown in Table 4. Again, the greater number of complex relations than linear ones is notable. The positive linear relationships included:

E 5, Restrictive treatment of subject-matter (Teacher-School), and

E 6, Pupil interest-attention (two measures).

The relation with E 5 is particularly interesting, indicating that the pupil has positive feelings about himself in relation to teacher and school in a clearly structured environment in which the task is clear and there are no ambiguities. This partially parallels the finding of greatest spelling gain for intermediate amounts of the same behavior, agreeing that the least restrictiveness does not appear to support either kind of growth. This result appears to contrast with the expectations of open classrooms in which freedom and lack of structure are assumed to have their greatest returns in the non-cognitive areas.

Composite E 2, Teacher control, general, related negatively to two of the self-concept measures, showing a partial parallel with its negative association with achievement gain for low SES pupils.

The interactions showed that greater gain for low SES pupils was associated with smaller amounts of:

E 2, Teacher control, general, and

E 3, Harsh control (two relationships).

Both of these measures interacted in the same way in the results for achievement. In addition, greater amounts of E 5, Restrictive treatment of subject-matter, were associated with greater gain for low SES pupils.

Two measures interacted with grade level: Greater amounts of E 7, Closeness of teacher attention to pupils, were associated with increased gain at the lower grade levels for two outcome measures, which parallels the results for achievement; and greater amounts of E 4, Teacher choice of subject matter, were associated with greater gain at the higher grade levels.

Among the nonlinear relations, E 4, Teacher choice of subject-matter appeared as curves opening upward for four measures, which also parallel the results for achievement, but are equally uninterpretable. Composite E 1, Gentle verbal control, related in the form of an inverted U, indicating that intermediate amounts of this behavior were associated with greatest gain.

Discussion

There seem to be two primary results from this study. One is the finding that the competencies often formed linear relations with the gain measures, but they were about as often contrary to expectations as in agreement with them. The second major outcome of the study is the tendency of the competencies to form linear relations, but, in contrast, for the empirical-logical composites to form complex relations with the pupil gain measures. A thought in relation to the few linear relations for the composites is that this study covers a wide range of grade levels, and linear relations could be masked as a consequence. But if this were the case, most of the interactions would be expected to occur with grade level, but this is not the case. Most occur with SES.

Still another possibility to consider is that the complex relations may be chance relations, entering the regression equations late. But they tend to enter in clusters, after the linear terms have been forced, often with F ratios in the teens, scattering through the 20's and into the 30's. And parallels appear across analyses, so it is hard to dismiss them as chance occurrences.

Both of these results are frankly perplexing. The clearest difference in the nature of the measures is that the competencies tend to have a greater variety of behaviors included in them, whereas the composites tend to be more narrowly focussed, but it is hard to see why this should lead to the difference in results.

What does seem clear is that there is little here to support the use of teacher derived competencies, but it is not clear where the problem lies--whether it is in the basic ideas represented in the competencies (which is a troublesome thought since they are ideas which have wide acceptance in education) -- or whether the problem lies in the selection of behaviors from these two instruments to represent the competencies. A more fine-grained analysis, at the level of the behavioral indicaters which were pooled into competencies, might help to answer this question.

An additional contrast is that for the teacher derived competencies there was no parallel in the measures which were positively related with gain across achievement and self-concept, but for the composites there were parallels in the measures which were related with gain in achievement and self-concept.

Among the composites which showed parallels across the analyses of achievement and self-concept were interactions indicating that teacher controlling behaviors which were harsh and closely restrictive were associated with decreased gain for low socioeconomic status pupils, and that closeness of teacher attention to pupils was more facilitative at the lower grade levels and/or less so at the higher grades. In general, these results for social status agree with earlier findings of Soar and Soar (1973), and Brophy and Evertson (1974). The finding that E 1, Gentle verbal control, was more facilitative for low SES pupils also agrees with earlier work (Soar & Soar, 1973).

It is not surprising to find instances of teacher behaviors which interacted with grade level, when the grades ranged from three through eight for achievement, and from four through twelve for self-concept. It would be surprising if the same teacher behaviors in the same amounts were functional for pupils across such wide age ranges, but this is a question which has received very little empirical study. Neither is it surprising that SES interacts with teacher behaviors, but the number of such findings is surprising.

The most troublesome thought of all, in relation to the findings as a whole, is that competency based programs are being implemented widely across the nation on the basis of conceptions which are probably much like those which underlie the competencies studied here. Implicit in the use of these competencies is the assumption that they identify teacher behaviors which facilitate the intellectual and personal growth of pupils at all grade levels and at all SES levels. But the results of these analyses, at least, raise question about these procedures and the assumptions which underlie them.

Equally distressing is the almost complete lack of support necessary either to evaluate programs which are being implemented at great cost, or to do the basic research necessary to identify the teacher behaviors which facilitate pupil growth and the circumstances under which they are functional.

The possibility that great effort and cost may be committed to changing teacher behavior in ways which may be harmful to pupils is intolerable.

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Table 1

Relations Between Teacher Derived Competencies[a]

and Pupil Achievement Gain

Achievement Measure	Linear Relations[b]	Complex Relations
Vocabulary	C9-*	C3XGR-**
		C1XGR+*
Reading	C4-**	
	C2+**	
	C6-*	
Spelling	C4-*	
Arithmetic Concepts	C3-**	
	C9+**	
Arithmetic Problems	C3-**	
		C3XGR-*

*P<.05 **P<.01 N=24 classrooms

a) C1. Gathers and uses information relating to individual differences among students.

C2. Organizes pupils, resources, and materials for effective instruction.

C3. Demonstrates ability to communicate effectively with students.

C4. Assists students in using a variety of relevant communication techniques.

C5. Assists students in dealing with their misconceptions or confusions, using relevant cues and techniques.

C6. Responds appropriately to coping behavior of students.

C7. Uses a variety of methods and materials to stimulate and promote pupil learning.

C8. Promotes self-awareness and positive self-concepts in students.

C9. Reacts with sensitivity to the needs and feelings of others.

b) See footnote, Table 3, for interpretation of table entries.

Table 2

Relations Between Empirical-Logical Composites[a]

and Pupil Achievement Gain

Achievement Measure	Linear Relations[b]	Complex Relations
Vocabulary	E7-*	E7XGR-** E2XSES-* $E4^{2}$+** E4XSES+**
Reading	E3-*	
Spelling		$E4^{2}$+** E3XSES-** E1XSES+** $E5^{2}$-**
Arithmetic Concepts		E1XGR-*
Arithmetic Problems		

*P<.05 **P<.01 N=24 classrooms

a) E1. Gentle verbal control

E2. Teacher control, general

E3. Harsh control, T&P negative affect

E4. T choice of subject matter

E5. Restrictive treatment of subject-matter

E6. Pupil interest-attention

E7. Closeness of T attention to P

E8. Small vs. large group activities

b) See footnote, Table 3, for interpretation of table entries.

Table 3

Relations Between Teacher Derived Competencies

and Pupil Self-Concept Gain

Achievement Measure	Linear Relations[a]	Complex Relations
Teacher-School	C1+**	
Physical Appearance	C4-** C8+**	
Interpersonal Adequacy	C1+** C4-*	
Autonomy	C6+**	
Academic Adequacy	C4-**	

*P<.05 **P<.01 N=40 classrooms

a) The tables are interpreted as follows: C9-* means that competency 9 was negatively related, significant at the 5 percent level. C3XGR means that competency 3 interacted with grade level; the negative sign means that the combination of one high value and one low value for the two variables (high C3 and low grade level, or the reverse) were associated with greater gain in the outcome measure. A positive sign means that high values for both or low values for both were associated with greatest gain. $E4^2$ means that Empirical-Logical Composite 4 showed a nonlinear relation with the outcome measure, with a + sign indicating that the curve opened upward, a - sign that it opened downward.

Table 4

Relations Between Empirical-Logical Composites

and Pupil Self-Concept Gain

Self-concept Measure	Linear Relations[a]	Complex Relations
Teacher-School	E2-*	E2XSES-*
	E5+*	E5XSES+*
Physical Appearance	E6+*	$E4^{2}+*$
		E3XSES-**
		E5XSES+**
Interpersonal Adequacy	E2-**	$E4^{2}+*$
		E7XGR-**
		E3XSES-*
		E4XGR+*
		E5XSES+*
		$E1^{2}-*$
Autonomy	E6+**	$E4^{2}+*$
Academic Adequacy		$E1^{2}-**$
		E7XGR-**
		$E4^{2}+**$

*P<.05 **p<.01 N=40 classrooms

a) See footnote, Table 3, for interpretation of table entries.